IOP Conference Series: Earth and Environmental Science 2018 vol.107 N1

Inter-annual variability of variations of ground and integrated atmospheric water vapor content in Europe

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© Published under licence by IOP Publishing Ltd. This paper presenting results of the seasonal, interannual mesoscale and synoptic variations of the surface and atmosphere integral moisture content variability analysis. More than 50 years of the meteostation network data and data from satellite navigation system receivers on Europe were analysed. The surface moisture content field in Europe decreases with increasing latitude and further from the coast. The intensity of variations in the partial pressure of water vapour, on the contrary, increases from northwest to southeast. It is shown, that the maximum contribution to the moisture content variability is given by seasonal variations. The predominant process of near ground and integrated atmospheric water content is year and half-year harmonics. In near ground and integrated atmospheric water content spectra the interannual variations were discovered. It is shown that the average annual values of the integral humidity, amplitude and phase of the annual and semiannual harmonics vary from year to year, as well as the intensity of the synoptic variations.

http://dx.doi.org/10.1088/1755-1315/107/1/012031

References

[1] Guiot J and Cramer W 2016 Science 354 468
[2] Perevedentsev Yu P, Gogol F V, Naumov E P and Shantalinskiy K M 2007 Probl. Anal. Riska 4 80
[3] Alshawaf F, Dick G, Heise S, Simeonov T, Vey S, Schmidt T and Wickert J 2016 Atmos. Meas. Tech. Discuss.
[4] Khutorova O G, Kalinnikov V V and Kurbangaliev T R 2012 Atmospheric and Oceanic Optics 25 529-533
[5] Internatioanal GNSS URL: http//igscb.jpl.nasa.gov/ - ref-separator -
[6] Bulygina O N, Korshunova N N, Razuvaev V Nl Description of the array of urgent data on the main meteorological parameters at Russian stations. Certificate of state registration of the database No. 2014620549 URL: http://meteo.ru/english/index.php - ref-separator -
[7] Khutorova O G, Vasilyev A A and Khutorova V E 2010 Atmospheric and Oceanic Optics 23 510-514
[8] Kalinnikov V V, Khutorova O G and Teptin G M 2012 Bulletin of the Russian Academy of Sciences: Atmospheric and Oceanic Physics 48 638
[9] Jenkins G and Watts D 1969 Spectral analysis and its attachments 1,2 (San Francisco: Holden-Day)
[10] Richard D and Salstein D A 1983 J. of Geo. Res. 88 5470
[11] Sidorenkov N 2004 Bulletin of the russian academy of sciences 74 715
[12] Astafeva N M, Raev M D and Sharkov E A 2007 Modern problems of remote sensing of the Earth from space 2 26